

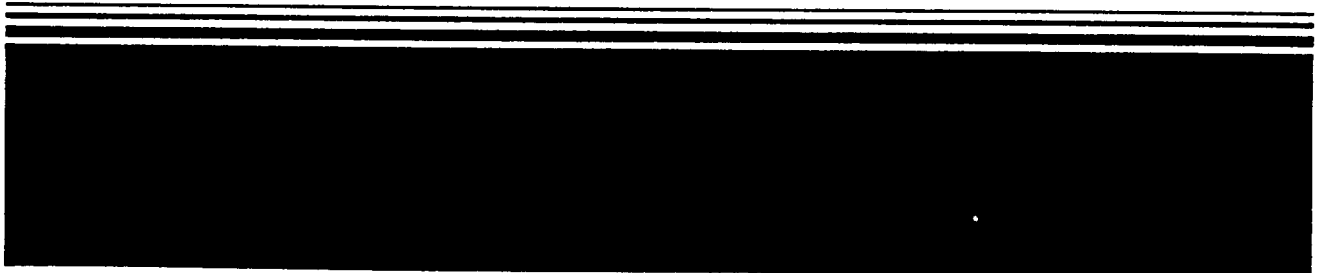


EPA

Superfund Record of Decision:

14709

Baird & McGuire, MA



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15. Supplementary Notes				
16. Abstract (Limit: 200 words) The 20-acre Baird & McGuire site is a former chemical manufacturing facility in Holbrook, Massachusetts. The South Street wellfield, part of the municipal water supply for Holbrook, is located within 1,500 feet of the property. Bordering on the east of the site, the Cochato River, which flows down past a sluice gate, is the major water supply source for the towns of Holbrook, Randolph, and Braintree. Products mixed and stored at the Baird & McGuire site included herbicides, pesticides, disinfectants, soaps, floor waxes, and solvents. Waste disposal methods at the site included direct discharge into the soil, nearby brook, and wetlands, as well as a former gravel pit (now covered) in the eastern portion of the site. In 1983, EPA conducted a removal action after a waste lagoon overflowed near the Cochato River and spread contaminants into the river. A second removal action was initiated in 1985 when dioxin was discovered in site soil. Between 1985 and 1987, EPA conducted an Initial Remedial Measure to construct a new water main to replace the main passing through the site and to place temporary caps over some of the site. The 1986 and 1989 Records of Decision (RODs) addressed all of the previous remedial activities at the site including pumping and onsite treatment of ground water (OU1), as well as onsite excavation and incineration of contaminated soil (See Attached Page)				
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EPA/ROD/R01-90/049
Baird & McGuire, MA
Third Remedial Action - Final

Abstract (Continued)

(OU2), and remediation of the sediment of the Cochato River (OU3). This remedial action addresses the fourth operable unit, provision of an alternate water supply to compensate for the loss of the South Street wellfield and provide an additional 0.31 million gallons/day. Since the previous RODs have addressed all of the site-related contamination, there are no contaminants of concern associated with this remedial action.

The selected remedial action for this site includes future reactivation of the Donna Road aquifer, by obtaining Federal and local permits to increase the allowable capacity of water withdrawal; constructing a new well, performing pre-design tests required to obtain the permits, ground water filtration and disinfection, and piping the water to the current distribution system. The estimated present worth cost for this remedial action is \$1,188,000, which includes an annual O&M cost of \$23,000 for 20 years.

PERFORMANCE STANDARDS OR GOALS: Not applicable.

DECLARATION FOR THE RECORD OF DECISION

**Baird & McGuire/Alternate Water Supply
Holbrook, Massachusetts**

Statement of Purpose

This Decision Document presents the selected remedial action for this Site developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, the National Contingency Plan (NCP), 40 CFR Part 300, 55 Federal Register 8666 (March 8, 1990).

The Commonwealth of Massachusetts has concurred with the selected remedy.

Statement of Basis

This decision is based on the Administrative Record which was developed in accordance with Section 113(k) of CERCLA and which is available for public review at the information repositories located at the Holbrook Public Library in Holbrook, Massachusetts, and at the EPA offices at 90 Canal Street in Boston, Massachusetts. The attached index identifies the items which comprise the Administrative Record upon which the selection of a remedial action is based.

Description of the Selected Remedy

A. Description of Remedial Components

After evaluating all of the feasible alternatives using the criteria for remedy selection, EPA has selected AW-1, the reactivation of the Donna Road aquifer, as the alternate water supply to replace the lost demand resulting from contamination of the South Street Wellfield. AW-1 can be broken into four components: (1) permitting/pre-design studies, (2) groundwater extraction, (3) treatment, and (4) delivery to distribution system. Each component is described below.

1. Permitting/Pre-Design Studies

Since the Donna Road Aquifer is not part of the Baird & McGuire Site, Section 121(e), which waives the administrative permitting requirements for remedial actions conducted on-site, is not applicable; therefore all necessary federal, state and local permits must be obtained for this remedial action. Two permits which will be critical to the timely implementation of this remedy will be a water withdrawal permit as required by the Massachusetts Water Management Act and a new source approval as required by the Massachusetts Department of Environmental Protection's (DEP) "Guidelines and Policies for Public Water Supplies" document.

The Randolph-Holbrook Joint Water Board currently has a water withdrawal permit which authorizes them to withdraw a total of 3.27 mgd from the following four points: South Street Well No. 1 (which was closed in 1982), Donna Road Wellfield, Richardi Reservoir and the Great Pond/Upper Reservoir. The Joint Water Board is currently operating close to that 3.27 mgd capacity; the addition of 0.31 mgd will exceed the permitted capacity thus requiring a new permit. In addition to a new permit for total volume of water, under the Massachusetts Water Management Act the addition of a new well constitutes a new withdrawal point and will also require a new permit.

The "Guidelines and Policies for Public Water Supplies" guide provides for a nine-step procedure for seeking Massachusetts Department of Environmental Protection (DEP) approval of a drinking water source. The process is a phased approach which include exploration and preliminary testing, a five day pump test, and a summary hydrologic report.

Although all studies and historical data indicate the Donna Road Aquifer should be able to meet the 0.31 mgd Lost Demand under the Source Approval Process, DEP may limit the pumping of the wells based on the safe yield (the maximum rate at which the system can be expected to deliver water continually under a defined set of drought conditions) of the aquifer. Should the Donna Road Aquifer be unable to provide the entire Lost Demand of 0.31 mgd, any incremental difference between 0.31 mgd and the amount of water the Donna Road Aquifer provides will be obtained by increasing the diversion of the Farm River. If however, the production of ground water from Donna Road is insufficient to support the balance between the remedy selection criteria, EPA will reexamine the remedy. EPA anticipates that a water production from Donna Road of less than 0.21 may prompt such a reevaluation.

2. Groundwater Extraction

The extraction system is conceptualized as two 12-inch diameter wells approximately 40 feet deep, and 800 to 1,000 feet apart, aligned perpendicular to groundwater flow. Submersible pumps located in each well will extract water and pump it directly to treatment units. It is anticipated that the pumps will be turned on and off by pressure/demand. The exact number and location of the wells will be refined during the hydrogeologic investigations necessary for the DEP's Source Approval Process.

3. Treatment

National Primary Drinking Water Regulations (NPDWR) (40 CFR 141, Subpart H) require that public water systems supplied by a groundwater source under the direct influence of surface water provide filtration and disinfection treatment processes, unless the supplier can demonstrate that the raw water source meets stringent criteria for bacteria and other microbiological contaminants. The filtration treatment steps proposed for iron and manganese control and the subsequent disinfection step will satisfy the requirements of 40 CFR 141, Subpart H.

As levels of iron and manganese in the Donna Road Aquifer exceed federal drinking water standards, included in this alternative, as with all the possible alternatives, is a potassium permanganate treatment system. The iron and manganese treatment system consists of adding potassium permanganate to the extracted water. The potassium permanganate then causes the iron and manganese to precipitate out of the water. The process is then followed by greensand filtration. The greensand acts as a filter to further remove precipitate.

Although the treatment method is well established, a pilot test will be performed to assure its effectiveness before design and implementation.

4. Distribution System

Treated groundwater will be piped to the current distribution system which is within a few hundred feet of the Randolph-Holbrook water distribution main. No modifications to the distribution system are anticipated.

Declaration

The selected remedy is protective of human health and the environment, attains Federal and State requirements that are applicable for this remedial action and is cost-effective. The selected remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. The

statutory preference for remedies that utilize treatment as a principal element to reduce the mobility, toxicity, or volume of hazardous substances is not applicable.

9/27/90
Date

Julie Belaga
Julie Belaga
Regional Administrator, EPA Region I

**BAIRD & MCGUIRE SITE
ALTERNATE WATER SUPPLY**

TABLE OF CONTENTS

<u>Contents</u>	<u>Page Number</u>
I. SITE NAME, LOCATION AND DESCRIPTION	1
II. SITE HISTORY AND ENFORCEMENT ACTIVITIES	2
A. Land Use and Response History	2
B. Enforcement History	3
III. COMMUNITY RELATIONS	5
IV. SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION . . .	5
V. SUMMARY OF SITE CHARACTERISTICS	6
VI. SUMMARY OF SITE RISKS	6
VII. DEVELOPMENT AND SCREENING OF ALTERNATIVES	6
A. Statutory Requirements/Response Objectives	6
B. Technology and Alternative Development and Screening	7
VIII. DESCRIPTION OF ALTERNATIVES	8
A. Alternate Water (AW) Supply Sources	8
IX. SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES . .	10
X. THE SELECTED REMEDY	15
XI. STATUTORY DETERMINATIONS	19
A. The Selected Remedy is Protective of Human Health and the Environment	19
B. The Selected Remedy Attains Applicable Requirements	19
C. The Selected Remedial Action is Cost-Effective . .	24
D. The Selected Remedy Utilizes Permanent Solutions and Alternative Treatment or Resource Recovery Technologies to the Maximum Extent Practicable . .	24
E. The Preference for Treatment Which Permanently and Significantly Reduces the Toxicity, Mobility or Volume of the Hazardous Substances as a Principal Element	25
XII. DOCUMENTATION OF SIGNIFICANT CHANGES	25
XIII. STATE ROLE	26

LIST OF TABLES

Summary of Groundwater Source Screening.	Table 1
Summary of Surface Water Source Screening.	Table 2
Comparative Summary of Water Supply Alternatives . . .	Table 3

LIST OF FIGURES

Candidate Site Locations	Figure 1
Donna Road Conceptual Treatment Schematic.	Figure 2

APPENDICES

Responsiveness Summary	Appendix A
Administrative Record Index	Appendix B
State Concurrence Letter	Appendix C

ROD DECISION SUMMARY
BAIRD & MCGUIRE SITE/ALTERNATE WATER SUPPLY

I. SITE NAME, LOCATION AND DESCRIPTION

The Baird & McGuire Site is located on South Street in northwest Holbrook, Massachusetts, approximately 14 miles south of Boston. The twenty-acre Site is bounded by South Street to the south and west, Mear Road to the north, and the Cochato River to the east. Approximately 2.5 miles downstream from the Site, the Cochato River flows past a sluice gate regulating the diversion of river water to the Richardi Reservoir, a water supply source for the towns of Holbrook, Randolph, and Braintree. This diversion has been closed since 1983.

Eight of the twenty acres have been owned by the Baird & McGuire, Inc. since 1912, when chemical manufacturing operations began. The Baird & McGuire property originally included a laboratory, storage and mixing buildings, an office building and a tank farm.

For over 70 years, Baird & McGuire, Inc. operated a chemical manufacturing and batching facility on the property. Later activities included mixing, packaging, storing and distributing various products, including herbicides, pesticides, disinfectants, soaps, floor waxes and solvents. Some of the raw materials used at the Site were stored in the tank farm and piped to the laboratory or mixing buildings. Other raw materials were stored in drums on-site. Waste disposal methods at the Site included direct discharge into the soil, nearby brook and wetlands, and a former gravel pit (now covered) in the eastern portion of the Site. Underground disposal systems were also used to dispose of wastes.

The Baird & McGuire Site includes a portion of the Cochato River sediments. This area begins at approximately the center of the Site fence along the Cochato River and extends north to Union Street.

The South Street wellfield, part of the municipal water supply for Holbrook, is within 1,500 feet of the Baird & McGuire property. The last operating well was shut down in 1982 due to organic contamination. Studies indicate that contaminants used or stored at the Site were possible sources for contamination of the well. In December 1982, the Baird & McGuire Site was placed on EPA's Proposed National Priorities List (NPL).

A more complete description of the Site can be found in the Focused Feasibility Study at pages 1-2 through 1-4.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

A. Land Use and Response History

In 1983, EPA conducted a removal action at the Site after a waste lagoon overflowed near the Cochato River and spread contaminants into the river. Emergency activities included removing approximately 1,000 cubic yards of heavily contaminated soils, construction of a groundwater interception/recirculation system to limit contaminated groundwater from migrating into the river, regrading the contaminated waste disposal area and covering it with a temporary clay cap. In response to the lagoon overflow, the Tri-Town Water Board (Holbrook, Randolph, and Braintree) closed the sluice gate located approximately 2.5 miles downstream from the Site that diverted water to the Richardi Reservoir. To date, the sluice gate remains closed.

A second removal action for the Site was initiated in 1985 following the discovery of dioxin in Site soils. EPA conducted additional sampling of air, soils and water, and an additional 5,600 feet of fence was installed at that time.

Another major activity conducted at the Site by EPA in 1985 through 1987 was an Initial Remedial Measure (IRM). A new water main was constructed along South Street to replace an existing main that passed through the Baird & McGuire Site. The water main passing through the Site was abandoned and filled with concrete. The Baird & McGuire laboratory and mixing buildings and tank farm were demolished and removed as part of the IRM, and a temporary synthetic cap was installed over that portion of the Site. Wood from the demolished buildings was shredded and placed into barrels and crates that are currently stored on-Site in the storage building.

A Record of Decision (ROD) for the Site, signed in 1986, divided the cleanup of the Baird & McGuire Site into operable units. An operable unit is a discrete part of an entire response action that decreases a release, a threat of a release, or a pathway of exposure. EPA determined in the 1986 ROD that operable units are appropriate for the overall remediation of the Baird & McGuire Site. The 1986 ROD selected two major remedial components, extraction and on-site treatment of groundwater (operable unit #1), and, on-Site excavation and incineration of contaminated soil, much of which is currently covered by temporary caps (operable unit #2). In addition, the demolition material remaining from the original Baird & McGuire buildings will be incinerated on-Site when the soil incineration portion of the long-term remedial action program is initiated.

EPA and the U.S. Army Corps of Engineers have completed the design of the on-Site groundwater extraction/treatment/recharge system (operable unit #1), and the U.S. Army Corps of Engineers

awarded the construction contract to Barletta Engineering Corporation in February 1990. In August 1989, a series of tests was conducted at EPA's Office of Research and Development facility in Arkansas aid in determining the operating procedures that will most effectively destroy soil contaminants. Preparation of the incineration system specifications is currently underway, and the solicitation of bids is expected to take place during the fall of 1990.

A second ROD for operable unit #3, which addressed Cochato River sediment contamination, was signed on September 14, 1989. The design is expected to begin in the fall of 1990.

This ROD is for operable unit #4 and addresses an alternate water supply/replacement of lost demand which resulted from the contamination and subsequent shutdown of the South Street wells.

A more detailed description of the Site history can be found in the Focused Feasibility Sediment Study at pages 1-5 through 1-6.

B. Enforcement History

The Baird & McGuire facility had a lengthy history of violating environmental laws. From the mid-1950s on, the company received numerous citations for violations of the Federal Insecticide, Fungicide, and Rodenticide Act. Further, both the state and the local governments took legal actions against the company at various times.

EPA involvement under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) began in March 1983 with the first removal action conducted at the Site. Baird & McGuire, Inc. ceased operating shortly thereafter, and the company and its officers took the position that they did not have sufficient assets to pay for the remedial work necessary at the Site.

In October 1983, the United States of America, on behalf of the Administrator of EPA, filed a cost recovery action under Sections 104(a) and (b) and 107(a) of CERCLA. The complaint sought reimbursement for costs incurred by the United States in remedying Site conditions from Baird & McGuire, Inc., Baird Realty Co., Inc. (subsequently know as the Ann E. Realty Trust, Inc.), Cameron M. Baird, and Gordon M. Baird.

Baird & McGuire, Inc. owned and operated the Baird & McGuire facility. Baird Realty Co., Inc. was a record owner of part of the Site. Cameron Baird was the president, treasurer, and chief executive of Baird & McGuire, Inc. Gordon M. Baird (Cameron's brother) was the chairman of the board of Baird & McGuire, Inc.

The government contends that both individuals exercised control over the company's conduct, activities and operations.

The defendants to the lawsuit, as listed above, are also the only Potentially Responsible Parties ("PRPs") identified to date by EPA.

The PRPs maintained from early on in discussions with EPA both that they lacked the financial assets to conduct the remedy and that they were not liable. The PRPs provided some information regarding their finances, and the United States obtained a lien on a parcel of property owned by the Ann E. Realty Trust, Inc. EPA subsequently determined that the PRPs were unable and unwilling to implement the full remedy at the Site.

The cost recovery action filed in 1983 was settled on an "ability to pay" basis in 1987. The Consent Decree that was signed by all parties in September 1987 includes the following requirements of the Defendants:

- A cash payment to EPA of \$900,000, made in two installments;
- Full EPA access to the Site for the purposes of implementing response actions;
- Liens on the Baird & McGuire property, which consists of 2 lots owned by the Ann E. Realty Trust and the Baird & McGuire lot; and
- Rights to insurance policies which may provide coverage for costs incurred in response to the release or threat of release of hazardous substances from the Baird & McGuire property.

Pursuant to the Baird's assignment to EPA of their rights regarding insurance policies, EPA has negotiated with insurers of Baird & McGuire, Inc for cost recovery. To date, no settlements have been reached with these parties.

The PRPs have had no involvement in the Focused Feasibility Study (FFS) and remedy selection process for this operable unit. EPA notified the public, including the PRPs, of the issuance of the Proposed Plan, but received no PRP comments on the Proposed Plan.

Special notice has not been issued in this case for the earlier operable units since the cost recovery case, filed in 1983, was settled with the only PRPs in 1987.

III. COMMUNITY RELATIONS

Throughout the Site's history, community concern and involvement has been high. EPA has kept the community and other interested parties apprised of the Site activities through Baird & McGuire Task Force meetings, informational meetings, fact sheets, press releases and public meetings.

In 1985, EPA released a community relations plan which outlines a program to address community concerns and keep citizens informed about and involved in activities during remedial activities. Throughout 1985 and 1986, EPA held a series of public informational meetings to describe the plans for and results of the Remedial Investigation, Feasibility Study, and other actions taken by the Agency at the Site during this time.

In May 1989, EPA made the administrative record available for public review at EPA's offices in Boston and at the Holbrook Public Library. The administrative record was updated in June 1989 to include documents used by the Agency for the Cochato River Sediment Study decision and again in June 1990 for the Alternate Water Supply/Lost Demand Study. In June 1990 EPA published a notice and a brief analysis of the Proposed Plan for this operable unit in The Patriot Ledger on June 22, 1990 and made the Plan available to the public at the Holbrook Public Library.

On June 26, 1990, EPA held an informational meeting to discuss the alternatives presented in the Alternate Water Supply Focused Feasibility Study and to present the Agency's Proposed Plan. Also during this meeting, the Agency answered questions from the public. From June 27, 1990 to July 26, 1990, the Agency held a 30 day public comment period to accept public comment on the alternatives presented in the Focused Feasibility Study, the Proposed Plan and on any other documents previously released to the public. On July 17, 1990, the Agency held a public hearing to discuss the Proposed Plan and to accept any oral comments. A transcript of this meeting, the comments, and the Agency's response to comments are included in the attached responsiveness summary.

IV. SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION

As anticipated in the "Future Action" section of the 1986 ROD for the Site, an Alternate Water Supply Focused Feasibility Study was performed to select a potential water source that could replace the lost demand which occurred when the South Street wells were shut down due to possible contamination resulting from Baird & McGuire industrial practices. This remedial action will address replacement of that lost demand.

V. SUMMARY OF SITE CHARACTERISTICS

This ROD does not address Site related contaminants, rather it involves selecting an alternate water supply to replace the South Street wells lost demand which occurred because of contamination from Baird & McGuire. The 1986 and 1989 RODs for operable units #1, #2 and #3 addressed all sources of contamination from the Baird & McGuire Site. A description of those Site characteristics can be found in Section 5.20-5.21.5 of the Remedial Investigation (RI) and Section 5.4-5.42.5 of the Addendum to the RI and pages 1-12 through 1-17 of the Cochato River Focused Feasibility Study. No further investigation of the Baird & McGuire Site was done in connection with this Focused Feasibility Study or ROD.

VI. SUMMARY OF SITE RISKS

The Alternate Water Supply FFS study area differs from the RI and RI Addendum Site study area (operable units #1 and #2) and the FFS Sediment study area (operable unit #3). The risks associated with each of these operable units were addressed in the 1986 and 1989 RODs. Risks associated with drinking of the groundwater in the South Street well area, the Lost Demand of which this alternate water supply will replace, is 4×10^{-3} , outside EPA's risk range of 1×10^{-4} to 1×10^{-6} . The South Street wells were closed in 1982 and therefore, no one is currently drinking water.

A complete description of the Baird & McGuire Site risks can be found in the 1987 Feasibility Study at pages 2-1 through 2-32 and the Sediment Focused Feasibility Study at pages 1-18 through 1-58.

As this operable unit does not address contamination from the Baird & McGuire Site, there were no site risks associated with this fourth operable unit. Therefore no risk assessment was performed in connection with this study.

VII. DEVELOPMENT AND SCREENING OF ALTERNATIVES

A. Statutory Requirements/Response Objectives

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that are protective of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences, including: a requirement that EPA's remedial action, when complete, must comply with all federal and more stringent state environmental standards, requirements, criteria or limitations, unless a waiver is

invoked; a requirement that EPA select a remedial action that is cost-effective and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and a preference for remedies in which treatment which permanently and significantly reduces the volume, toxicity or mobility of the hazardous substances is a principal element over remedies not involving such treatment. Section 121 also provides that if EPA selects a remedy not appropriate for the above preferences, EPA is to publish an explanation as to why a remedial action involving such reduction was not selected. Response alternatives were developed to be consistent with these Congressional mandates.

Based on preliminary information such as constraints of the present water system and known available water sources, a remedial action objective was developed to aid in the development and screening of alternatives. The response objective for operable unit #4 is:

- to identify a candidate water source that will replace the 0.31 million gallons per day (mgd) Lost Demand in an environmentally sound, cost-effective manner without placing additional stress on the Great Pond Reservoir system or existing water treatment facilities.

B. Technology and Alternative Development and Screening

CERCLA and the NCP set forth the process by which remedial actions are evaluated and selected. In accordance with these requirements, a range of alternatives was developed for the site.

As discussed in Chapter 3 of the Focused Feasibility Study, alternate water supply sources were identified, assessed and screened based on implementability, effectiveness, and cost (Figure 1 and Tables 1 and 2). The purpose of the initial screening was to narrow the number of potential remedial actions for further detailed analysis while preserving a range of options. Each alternative was then evaluated and screened in Chapter 3 of the Feasibility Study.

In summary, of the 13 alternate water supply sources screened in Chapter 3, three plus the no action alternative were retained for detailed analysis. Tables 1 and 2 identify the three alternatives that were retained through the screening process, as well as those that were eliminated from further consideration.

VIII. DESCRIPTION OF ALTERNATIVES

This Section provides a narrative summary of each alternative evaluated. A detailed tabular assessment of each alternative can be found in Table 5-3 of the Focused Feasibility Study.

A. Alternate Water (AW) Supply Sources

Alternative NA: No Action (AW-NA)

Analysis of the No Action alternative is required by federal law and is included for comparison with other alternatives. In this alternative, no alternative water supply to replace the lost demand would be developed.

ESTIMATED FIVE-YEAR REVIEW COSTS: \$ 0

ESTIMATED TOTAL COST (NPW): \$ 0

Alternative 1: Reactivation of the Donna Road Aquifer (AW-1)

This alternative has been chosen as EPA's preferred alternative for the Alternate Water Supply/Replacement of Lost Demand. See pages 15 through 19 for a discussion of the selected remedy.

Alternative 2: Increased Farm River Diversion (AW-2)

In this alternative, an additional 0.31 mgd of water would be diverted from the Farm River into the Richardi Reservoir to replace the Lost Demand. The Farm River currently provides an undocumented volume of water to the Richardi Reservoir through a diversion channel located at the north end of the reservoir. Currently, water drawn from the Richardi Reservoir is treated and disinfected at the Randolph-Holbrook water treatment facility. This facility operates beyond capacity at times, and expansion of the facility would be necessary if the flow from the reservoir and, hence to the treatment facility, were increased. The Randolph-Holbrook Joint Water Board is planning to expand the capacity of the water treatment plant to address its current overload situation; implementation of this alternative would be possible only after completion of the expansion.

Additionally, since levels of iron and manganese in the Farm River exceed federal drinking water standards, included in this alternative is a potassium permanganate treatment system to be installed at the Randolph-Holbrook treatment facility. This iron and manganese treatment system consists of adding potassium permanganate to the extracted water; the potassium permanganate causes the iron and manganese to precipitate (form a solid and drop out of the solution) out of the water. The process is then followed by greensand filtration. The greensand acts as a filter

to further remove precipitate. The water would then be disinfected at the Randolph/Holbrook Water Treatment Plant.

Implementation of this alternative would require compliance with the Massachusetts Water Management Act (obtaining a water withdrawal permit) and obtaining a Source Approval under the DEP "Guidelines and Policies for Public Water Supplies" document. (See Section X.A.1, page 15, 16 for a description of these processes).

ESTIMATED TIME FOR DESIGN AND CONSTRUCTION: Dependent upon expansion of the Randolph-Holbrook treatment facility and DEP permits and approvals.

ESTIMATED CAPITAL COST: \$306,000

ESTIMATED O & M (Present Worth): \$68,100

ESTIMATED TOTAL COST (Present worth): \$374,000

Alternative 3: Diversion of Cochato River (AW-3)

In this alternative, the diversion of the Cochato River into the Richardi Reservoir would be re-established. The Cochato River is capable of supplying the 0.31 mgd Lost Demand. Water quality in the Cochato River was extensively analyzed during this FFS and during the Cochato River Sediment FFS. The results of these studies indicated that, like the Farm River and the Donna Road Aquifer, the only contaminants which exceed federal drinking water standards are iron and manganese.

Like alternative AW-2, water from the Cochato River would be currently drawn from the Richardi Reservoir is treated and disinfected at the Randolph-Holbrook water treatment facility. This facility operates beyond capacity at times, and expansion of the facility would be necessary if the flow from the reservoir and, hence to the treatment facility, were increased. The Randolph-Holbrook Joint Water Board is planning to expand the capacity of the water treatment plant to address this current overload situation; implementation of this alternative would be possible only after completion of the expansion.

Additionally, since levels of iron and manganese in the Cochato River exceed federal drinking water standards, included in this alternative is a potassium permanganate treatment system to be installed at the Randolph-Holbrook treatment system. This iron and manganese treatment system consists of adding potassium permanganate to the extracted water. The potassium permanganate causes the iron and manganese to precipitate from the water. The process is then followed by greensand filtration. The greensand acts as a filter to further remove precipitate. The water would then be treated at the Randolph/Holbrook water treatment facility.

Implementation of this alternative would require compliance with the Massachusetts Water Management Act (obtaining a water

withdrawal permit) and obtaining Source Approval under DEP "Guidelines and Policies for Public Water Supplies" document. (See Section X.A.1, page 15, 16 for a description of these processes).

ESTIMATED TIME FOR DESIGN AND CONSTRUCTION: Dependent upon expansion of the Randolph-Holbrook treatment facility and DEP permits and approvals.

ESTIMATED CAPITAL COST: \$306,000

ESTIMATED O & M (Present Worth): \$68,100

ESTIMATED TOTAL COST (Present worth): \$374,000

IX. SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

Section 121(b)(1) of CERCLA presents several factors that, at a minimum, EPA is required to consider in its assessment of alternatives. Building upon these specific statutory mandates, the National Contingency Plan articulates nine evaluation criteria to be used in assessing the individual remedial alternatives. In addition, for this operable unit, the criteria from "Guidance Document of Providing Alternate Water Supplies" (OSWER Directive 9355.03-03) were also used. These criteria allow for a more focused and detailed analysis of an alternate water supply alternative than would the nine criteria alone. Those criteria are consistent with the nine criteria and can be interchanged in the FFS as follows:

1. Overall Protection of Human Health and the Environment	Public Health Analysis and Environmental Analysis
2. Compliance with ARARs	Compliance with ARARs
3. Long-Term Effectiveness and Permanence	Performance and Reliability
4. Reduction of Mobility, Toxicity or Volume through Treatment	Not Applicable
5. Short-Term Effectiveness	Timeliness and Safety
6. Cost	Cost
7. Implementability	Implementability/Constructability
8. State Acceptance	State Acceptance
9. Community Acceptance	Community Acceptance

A detailed analysis was performed on the alternatives using the evaluation criteria in order to select a site remedy. The following is a summary of the comparison of each alternative's strengths and weaknesses with respect to the evaluation criteria. These criteria and their definitions are as follows:

Threshold Criteria

The two threshold criteria described below must be met in order for the alternatives to be eligible for selection in accordance with the NCP.

1. **Overall protection of human health and the environment** addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls, or institutional controls.
2. **Compliance with Applicable or relevant and appropriate requirements (ARARS)** addresses whether or not a remedy will meet all of the ARARS of other Federal and State environmental laws and/or provide grounds for invoking a waiver.

Primary Balancing Criteria

The following five criteria are utilized to compare and evaluate the elements of one alternative to another that meet the threshold criteria.

3. **Long-term effectiveness and permanence** addresses the criteria that are utilized to assess alternatives for the long-term effectiveness and permanence they afford, along with the degree of certainty that they will prove successful.
4. **Reduction of toxicity, mobility, or volume through treatment** addresses the degree to which alternatives employ recycling or treatment that reduces toxicity, mobility, or volume, including how treatment is used to address the principal threats posed by the site.
5. **Short-term effectiveness** addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until cleanup goals are achieved.
6. **Implementability** addresses the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

7. **Cost** includes estimated capital and Operation and Maintenance (O&M) costs, as well as present-worth costs.

Modifying Criteria

The modifying criteria are used on the final evaluation of remedial alternatives generally after EPA has received public's comment on the RI/FS and Proposed Plan.

8. **State acceptance** addresses the State's position and key concerns related to the preferred alternative and other alternatives, and the State's comments on ARARs or the proposed use of waivers.
9. **Community acceptance** addresses the public's general response to the alternatives described in the Proposed Plan and RI/FS report.

A detailed tabular assessment of each alternative according to the criteria can be found in Table 5-3 of the Feasibility Study.

Following the detailed analysis of each individual alternative, a comparative analysis, focusing on the relative performance of each alternative against the criteria, was conducted. This comparative analysis can be found in Table 3.

The section below presents the criteria and a brief narrative summary of the alternatives and the strengths and weaknesses according to the detailed and comparative analysis.

1. Overall Protection of Human Health and the Environment

AW-1, AW-2, and AW-3 would all be protective of human health and the environment by providing clean drinking water by treatment. Each of these alternatives is equally protective since Maximum Contaminant Levels (MCLs) will be achieved for all compounds after treatment.

2. Compliance with ARARS

Each alternative was evaluated for compliance with ARARs, including chemical-specific, action-specific, and location specific ARARs. AW-1 and AW-3 meet their respective ARARs. AW-2 may not meet the requirements of Executive Order 11990 (Protection of Wetlands). Since the present volume of water being diverted from the Farm River is unknown, it is not possible to quantify the impact that an additional 0.31 mgd diversion would have on downstream wetlands. AW-NA would meet ARARS when the Randolph-Holbrook treatment facility is upgraded to include iron and manganese treatment.

3. Long-Term Effectiveness and Permanence

Alternative AW-1 offers the greatest degree of long-term effectiveness and permanence. AW-1 is expected to be capable of supplying 0.31 mgd based on previous usage of Donna Road Aquifer at 0.5 mgd.

Alternatives AW-2 and AW-3 also offer long-term protectiveness and permanence but, not to as great a degree as AW-1. As noted above, diverting an additional 0.31 mgd from the Farm River may have negative impacts on downstream wetlands; therefore, it is possible that withdrawal might need to be limited at times of low flow. This potential reduces the degree of certainty that AW-2 will prove successful, and thus makes alternative AW-2 less effective in meeting EPA's goal of providing a water source to meet the lost demand. For Alternative AW-3, since no water is currently being diverted, it is less likely than AW-2 that a low flow condition would occur.

Alternative AW-NA will not replace the Lost Demand, and will result in continued reliance on existing water supply and treatment systems; it is neither effective in the long-term nor will it provide a permanent replacement of the lost water demand.

4. Reduction of Mobility, Toxicity, or Volume through Treatment

The reduction of mobility, toxicity and volume through treatment was determined not to be applicable to this operable unit since site contaminants are not being treated under this operable unit.

5. Short-Term Effectiveness

As noted above, since this ROD does not involve treatment of site contaminants, the short-term effectiveness criteria can not be evaluated using the time frame for protection of human health and the environment. This criterion can, however, be used to evaluate the time frame necessary for implementation. Alternatives AW-1, AW-2 and AW-3 all require issuance of a withdrawal permit under the Massachusetts Water Management Act and each must also go through the Massachusetts Department of Environmental Protection (DEP) Source Approval Process. It is estimated that two to three years will be required to develop Alternatives AW-1, AW-2 or AW-3. Although it appears that AW-2 and AW-3 are equivalent in short-term effectiveness to AW-1, there are two factors which impact the start of implementation of alternatives AW-2 or AW-3 that are outside the control of either EPA or DEP, which make it impossible to predict when the process would begin. Those factors are: (1) the schedule for increasing the capacity of the Randolph-Holbrook water treatment facility, and (2) the schedule for upgrading the Randolph-Holbrook water treatment facility to achieve the Secondary Maximum Contaminant Levels (SMCLs) for manganese. Because of this dependency,

implementation of alternatives AW-2 and AW-3 are considered less timely than AW-1.

Alternative AW-NA does not require performance of any activities, and will not require any time to implement. However, it is considered ineffective in the short-term since it does not meet EPA's objective to provide a water source.

6. Implementability

No engineering problems are foreseen for construction of the wellfield and required water treatment facilities for AW-1 or diversions under alternative AW-2 and AW-3. For AW-1 the estimated 16-by-30-foot treatment building will fit within available space at the end of Donna Road, and access for facility construction and for O&M personnel would be via existing streets. As for Alternatives AW-2 and AW-3, structures are already in place for diverting the Farm and Cochato Rivers; therefore AW-2 and AW-3 are easily implementable from a technical standpoint.

The major concern with implementability of alternatives AW-2 and AW-3 is EPA's lack of control over the plans and schedule of the Randolph-Holbrook Joint Water Board to increase capacity and upgrade treatment.

Since no new construction would be necessary to implement Alternative AW-NA, the implementability of the no-action alternative is high. This alternative can be considered already implemented.

7. Cost

The estimated present worth value of each alternative is as follows:

		COST COMPARISON		
		<u>Capital Costs</u>	<u>O&M Costs¹ (\$/year)</u>	<u>Present Worth</u>
AW-NA	No Action	\$ 0	0	0
AW-1	Reactivation of Donna Road Aquifer	992,000	23,000	1,188,000

¹O&M costs are not EPA's responsibility, and EPA will not provide O&M funds; however, O&M costs for a twenty year period were included in the estimates to enable comparison of total project costs.

		<u>Capital Costs</u>	<u>O&M Costs² (\$/year)</u>	<u>Present Worth</u>
AW-2	Increased Diversion of the Farm River	306,000	8,000	374,000
AW-3	Cochato River Diversion	306,000	8,000	374,000

8. State Acceptance

The DEP has been involved with the Site from the early 1970's and throughout the CERCLA process. At the request of DEP, EPA has included an additional provision in this alternative. This additional provision involves the use of the Farm River diversion should the Donna Road aquifer be unable to provide the entire 0.31 mgd. The DEP has reviewed the Alternate Water Supply Focused Feasibility Study and concurs with the selected alternate water supply alternative.

9. Community Acceptance

The comments received during the public comment period and the discussions during the Proposed Plan and Feasibility Study public meeting are summarized in the attached document entitled "The Responsiveness Summary" (Appendix A). Generally, all commenters agreed with EPA's proposed remedy. Commenters did want assurances, however, that 0.31 mgd of water would be provided. As outlined in Section XI, in response to comments received during the public comment period, EPA has included in the selected remedy a provision to supplement the water pumped from the Donna Road aquifer if Donna Road is unable to produce 0.31 mgd. Commenters, particularly the Baird & McGuire Task Force, were strongly against AW-3 (Cochato River) as an alternate water supply, due to a perception that the Cochato River surface water contains contamination from the Baird & McGuire Site.

X. THE SELECTED REMEDY

As indicated in Section II.A above, this ROD is for operable unit #4, Alternate Water Supply; operable units #1 and #2 were addressed in the 1986 ROD and operable unit #3 was addressed in the 1989 ROD.

²O&M costs are not EPA's responsibility, and EPA will not provide O&M funds; however, O&M costs for a twenty year period were included in the estimates to enable comparison of total project costs.

A. Description of Remedial Components

After evaluating all of the feasible alternatives using the criteria for remedy selection, EPA has selected AW-1, the reactivation of the Donna Road Aquifer, as the Alternate Water Supply to replace the Lost Demand resulting from contamination of the South Street Wellfield. AW-1 can be broken into four components: (1) permitting/pre-design studies, (2) groundwater extraction, (3) treatment, and (4) delivery to distribution system. Each component is described below.

1. Permitting/Pre-Design Studies

Since the Donna Road Aquifer is not part of the Baird & McGuire Site, Section 121(e), which waives the administrative permitting requirements for remedial actions conducted on-site, is not applicable; therefore all necessary federal, state and local permits must be obtained for this remedial action. Two permits which will be critical to the timely implementation of this remedy will be a water withdrawal permit as required by the Massachusetts Water Management Act and a new source approval as required by the DEP "Guidelines and Policies for Public Water Supplies" document.

The Randolph-Holbrook Joint Water Board currently has a water withdrawal permit which authorizes them to withdraw a total of 3.27 mgd from the following four points: South Street Well No. 1 (which was closed in 1982), Donna Road Wellfield, Richardi Reservoir and the Great Pond/Upper Reservoir. The Joint Water Board is currently operating close to that 3.27 mgd capacity; the addition of 0.31 mgd will exceed the permitted capacity thus requiring a new permit. In addition to a new permit for total volume of water, under the Massachusetts Water Management Act the addition of a new well constitutes a new withdrawal point and will also require a new permit.

The application process for the withdrawal permit consists of:

- o Preparation of an application package including but not limited to:
 - general system information
 - historic and projected withdrawals
 - water demand estimates
 - preparation by the Town of Holbrook of a water conservation program and timetable of implementation

- alternatives to the withdrawal
- potential effects of the withdrawal on surrounding water based users (e.g., wetlands, ash and wildlife, recreation)
- acceptance by Massachusetts Department of Water Supply under the source approval guidelines
- o Notification of abutters and publication of notice of intent to withdraw water:
- o Response to any public comments

DEP also requires a Source Approval for any public drinking water supply over 100,000 mgd. The Source Approval Permit process is outlined in the "Guidelines and Policies for Public Water Supplies" document. The process includes the following nine steps:

1. Exploratory Phase;
2. Site Exam Request;
3. Site Exam;
4. Pump Test Approval;
5. Pump Test Proposal Review and Approval;
6. Pump Test;
7. Pump Test Report;
8. Final Report; and
9. Approval.

This process is expected to take six (6) months to one year. Further details of each of the nine steps can be found in Appendix A of the FFS.

Although all studies and historical data indicate the Donna Road Aquifer should be able to meet the 0.31 mgd Lost Demand under the Source Approval Process, DEP may limit the pumping of the wells based on the safe yield (the maximum rate at which the system can be expected to deliver water continually under a defined set of drought conditions) of the aquifer. Should the Donna Road Aquifer be unable to provide the entire Lost Demand of 0.31 mgd, any incremental difference between 0.31 mgd and the amount of water the Donna Road Aquifer provides will be obtained by increasing the diversion of the Farm River. If however, the

production of ground water from Donna Road is insufficient to support the balance between the remedy selection criteria, EPA will reexamine the remedy. EPA anticipates that a water production from Donna Road of less than 0.21 may prompt such a reevaluation.

2. Groundwater Extraction

The extraction system is conceptualized as two 12-inch diameter wells approximately 40 feet deep, and 800 to 1,000 feet apart, aligned perpendicular to groundwater flow. Submersible pumps located in each well will extract water and pump it directly to treatment units. It is anticipated that the pumps will be turned on and off by pressure/demand. The exact number and location of the wells will be refined during the hydrogeologic investigations necessary for the DEP's Source Approval Process.

3. Treatment

National Primary Drinking Water Regulations (NPDWR) (40 CFR 141, Subpart H) require that public water systems supplied by a groundwater source under the direct influence of surface water provide filtration and disinfection treatment processes, unless the supplier can demonstrate that the raw water source meets stringent criteria for bacteria and other microbiological contaminants. The filtration treatment steps proposed for iron and manganese control and the subsequent disinfection step will satisfy the requirements of 40 CFR 141, Subpart H.

As levels of iron and manganese in the Donna Road Aquifer exceed federal drinking water standards, included in this alternative, as with all the possible alternatives, is a potassium permanganate treatment system. The iron and manganese treatment system consists of adding potassium permanganate to the extracted water. The potassium permanganate then causes the iron and manganese to precipitate out of the water. The process is then followed by greensand filtration. The greensand acts as a filter to further remove precipitate (Figure 2).

Although the treatment method is well established, a pilot test will be performed to assure its effectiveness before design and implementation.

4. Distribution System

Treated groundwater will be piped to the current distribution system which is within a few hundred feet of the Randolph-Holbrook water distribution main. No modifications to the distribution system are anticipated.

XI. STATUTORY DETERMINATIONS

The remedial action selected for implementation at the Baird & McGuire Site is consistent with CERCLA and, to the extent practicable, the NCP. The selected remedy is protective of human health and the environment, attains ARARs and is cost effective. Additionally, the selected remedy utilizes alternate treatment technologies or resource recovery technologies to the maximum extent practicable.

A. The Selected Remedy is Protective of Human Health and the Environment

The remedy at this Site will permanently reduce the risks posed to human health and the environment by eliminating, reducing or controlling exposures to human and environmental receptors through treatment, engineering controls, or institutional controls; more specifically, since water from the Donna Road Aquifer meets all MCLs, and Massachusetts Maximum Contaminant Levels (MMCLs) except sodium, and can meet all Maximum Contaminant Level Goals (MCLGs), Secondary Maximum Contaminant Levels (SMCLs) with treatment the remedy is considered protective of human health and the environment. Implementation of the selected remedy will not pose unacceptable short-term risks or cross-media impacts, since any wetland impacts will be mitigated, if necessary, by the source approval process limiting pumping rates.

B. The Selected Remedy Attains Applicable Requirements

This remedy will attain all applicable federal and state requirements that apply to the Site. Since this remedy is being conducted entirely off-site only applicable requirements, including obtaining all applicable permits will be required. Environmental laws from which applicable requirements for the selected remedial action are derived, and the specific applicable requirements include:

Chemical Specific

Safe Drinking Water Act
Massachusetts Drinking Water Regulations

Location Specific

Executive Order 11990 (Wetlands Protection)
Fish and Wildlife Coordination Act
Clean Water Act
Rivers and Harbors Act of 1899

Resource Conservation and Recovery Act (Land Ban)
 Massachusetts Wetlands Protection Act
 Massachusetts Waterways Act
 Massachusetts Surface Water Quality Standards
 Massachusetts Ground Water Quality Standards
 Massachusetts Water Quality Certification and Certification of
 Dredging
 Massachusetts Water Management Act
 Massachusetts Supervision of Inland Waters

Action Specific

Occupational Safety and Health Act
 Massachusetts Guidelines & Policies for Public
 Water Systems

A discussion of why these requirements are applicable may be found in the FFS Report at pages 2-1 through 2-23 and pages 5-33 through 5-55.

1. Chemical-specific Applicable Requirements

a. Safe Drinking Water Act

Since the purpose of this FFS was to develop a drinking water source to replace the lost demand from the South Street wells, the National Primary Drinking Water Regulations (NPDWR) which establish Maximum Contaminant Levels (MCLs) that specify the maximum permissible level of a contaminant in water used as a public water supply are applicable.

National Secondary Drinking Water Regulations establish Secondary Maximum Contaminant Levels (SMCLs), are also applicable and can be met with treatment.

b. Massachusetts Drinking Water Regulations

As with the National Primary Drinking Water Regulations, since the purpose of this remedy is to establish a drinking water source for the Town of Holbrook, the Massachusetts Drinking Water Regulations (310 CMR 22.00) are applicable to this remedy. Data indicate that water from the Donna Road Aquifer meets all MMCLs except for sodium (27 mg/L versus 20 mg/L). The MMCL for sodium is based on the amount of sodium recommended from drinking water for individuals on a reduced-sodium diet. DEP generally does not shut down a water supply because sodium levels slightly exceed the MMCL; rather, it requires the water supplier to notify persons served by the water supply of the sodium levels and possible ways of correcting the situation (310 CMR 22.16), thus this requirement can be met.

2. Location-specific Applicable Requirements

a. Executive Order 11990 (Wetlands Protection)

Executive Order 11990, Wetlands Protection, is applicable to actions involving construction of facilities in wetlands or alterations of wetland property. Since AW-1 is located in a wetland, the Wetland Executive Order is applicable.

b. Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (16 USC 661 et seq.) requires that before issuing a federal permit or undertaking any federal action that causes the impoundment (with certain exemptions), diversion, or other control or modification of any body of water, the applicable federal agency must consult with (1) the appropriate state agency exercising jurisdictions over wildlife resources; (2) the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service, within the Department of Interior; and (3) the National Marine Fisheries Service, within the Department of Commerce. Since AW-1 is to take place in the Trout Brook bottomland this Act is applicable.

c. Clean Water Act

Section 402 of the Clean Water Act (CWA) regulates the discharge of pollutants into navigable waters of the U.S. A National Pollutant Discharge Elimination System (NPDES) permit must be obtained from EPA or a delegated state agency for such a discharge. The discharge of filter backwash from a water treatment facility to a surface water body would require an NPDES permit.

Section 404 of the CWA regulates the discharge of dredged and fill materials to waters of the U.S. Filling wetlands would be considered a discharge of fill material to waters of the U.S. If construction of access roads in the Trout Brook bottomland are deemed necessary during the permitting process or pre-design studies, it would be considered a disturbance of a wetland and section 404 of the CWA would be applicable.

d. Rivers and Harbors Act of 1899

Section 10 of the Rivers and Harbor Act of 1899 requires authorization from the Secretary of the Army, acting through the U.S. Army Corps of Engineers (USACE), for the construction of any structure in or over any "navigable water of the U.S.," the excavation from or deposition of material in such waters, or any obstruction or alteration in such waters. Should additional diversion be needed to supplement the Donna Road supply by using the Farm River, this Act would be considered applicable.

e. Resource Conservation and Recovery Act (Land Ban)

Since this ROD does not involve the disposal or treatment of hazardous substances, land ban requirements are not applicable.

f. Massachusetts Wetlands Protection Act.

At the state level, similar to the Wetlands Executive Order, wetlands and land subject to flooding are protected under the Massachusetts Wetlands Protection Act (MGL, Chapter 131) and wetlands regulations at 310 CMR 10.00. Since AW-1 involves work in the wetlands, the Act is applicable.

g. Massachusetts Waterways Act

The Massachusetts Waterways Act (MGL, Chapter 91) and regulations at 310 CMR 9.00 require that a license from DEP be obtained for any work in or over any tidelands, river or stream (with respect to which public funds have been expended), or great pond, or any outlet thereof. Farm and Cochato Rivers are considered to be subject to these regulations. Should additional diversion be needed to supplement the Donna Road supply by using the Farm River, this Act would be considered applicable.

h. Massachusetts Surface Water Quality Standards and Ground Water Quality Standards

The Massachusetts Surface Water Quality Standards and Ground Water Quality Standards (314 CMR 4.00 and 314 CMR 6.00, respectively) set forth procedures to be used by the state in classifying surface water and groundwater according to the uses which the class is intended to protect. For each class, the most sensitive beneficial uses are identified and minimum criteria for water quality are established. The regulations establish three classes for inland surface waters according to the most sensitive and therefore governing uses the classes are intended to protect. In accordance with 314 CMR 4.04 and 6.04, the quality of surface water will be maintained and protected to sustain existing beneficial uses. In addition, water whose quality is or becomes higher will be maintained at that higher level of quality unless limited degradation is authorized. Since AW-1 involves surface water discharge permits, the standards are applicable.

i. Massachusetts Water Quality Certification and Certification of Dredging

For activities that require a DEP Wetlands Order of Conditions to dredge or fill waters or wetlands, a Chapter 91 Waterways License, a USACE permit, or any major permit issued by EPA (e.g., CWA NPDES permit), a Massachusetts Division of Water Pollution Control Water Quality Certification pursuant to 314 CMR 9.00 is

required. As in Section XI.B.2.c above, if an additional access road is necessary then this certification is applicable.

j. Massachusetts Water Management Act

Under the Massachusetts Water Management Act (MGL Chapter 21G) and regulations (310 CMR 36.00), DEP, in conjunction with the Executive Office of Environmental Affairs Water Resource Commission, implements a program to assess and regulate the use of water in the state, plan for future water needs, and assess the safe yields of all river basins.

The program requires registration with the DEP Division of Water Supply (DWS) of withdrawals of ground or surface water in Massachusetts above an daily average of 100,000 gallons for a quarter year. A permit must be obtained prior to making a new withdrawal in excess of the threshold volume from a water source or constructing the means to make the withdrawal. A new withdrawal also includes an increase above the registered withdrawal in excess of the threshold value of 100,000 gallons per day. Alternative AW-1 includes a withdrawal over the threshold, a new withdrawal and an increase above the registered withdrawal, thus the Water Management Act is applicable.

k. Massachusetts Supervision of Inland Waters Act

Section 111, MGL Chapters 159 and 160, gives general oversight and care of all inland waters and of all streams, ponds and underground waters used by any city or town in the commonwealth as sources of water. The provision requires recordkeeping by DEP. Since the Donna Road aquifer is an underground water, this Act is applicable.

3. Action-specific Applicable Requirements

a. Occupational Safety and Health Act

The Occupational Safety and Health Administration (OSHA) standards (i.e., 29 CFR 1910, 1904, and 1926) apply to worker safety, and require employers to communicate risks at the workplace to employees. OSHA standards must be complied with during all site work.

b. Massachusetts Guidelines & Policies for Public Water Systems

The DEP DWS published a document that provides guidance for the exploration, evaluation, treatment, storage/distribution, and protection of new public water supply sources (DEP, 1990). For all groundwater withdrawals, the document specifies an exploration phase, site exam, five-day pump test, requirements for delineating three affected zones, and a final report.

C. The Selected Remedial Action is Cost-Effective

In the Agency's judgment, the selected remedy is cost-effective, i.e., the remedy affords overall effectiveness proportional to its costs. In selecting this remedy, once EPA identified alternatives that are protective of human health and the environment and that attain, or, as appropriate, waive applicable requirements, EPA evaluated the overall effectiveness of each alternative by assessing the relevant three criteria--long term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness, in combination. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs. The costs of this remedial alternative are: \$992,000 in capital costs, and \$23,000 annually for 20 years for operation and maintenance, resulting in a total net present worth of \$1,188,000.

Each of the alternatives evaluated is protective of human health and the environment; however, when evaluated in conjunction with short- and long-term effectiveness and permanence, Alternative AW-1 is the most cost-effective. AW-1 will provide a separate water source that has been shown to be able to produce in excess of the 0.31 mgd lost demand. Alternative AW-1 is most effective in the short-term since, unlike AW-2 and AW-3 it is not dependent on the Randolph-Holbrook Joint Water Board for upgrade of the treatment plant. Alternative AW-2 may impact downstream wetlands which could cause water withdrawal to be restricted. As noted above, the reduction of mobility, toxicity and volume was determined not to be applicable to this operable unit because site contaminants are not being treated under this remedy.

D. The Selected Remedy Utilizes Permanent Solutions and Alternative Treatment or Resource Recovery Technologies to the Maximum Extent Practicable

Once the Agency identified those alternatives that attain or, as appropriate, waive applicable requirements and that are protective of human health and the environment, EPA attempts to identify which alternative utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. This determination was made by deciding which one of the identified alternatives provides the best balance of trade-offs among alternatives in terms of: 1) long-term effectiveness and permanence; 2) reduction of toxicity, mobility or volume through treatment; 3) short-term effectiveness; 4) implementability; and 5) cost. The balancing test emphasized long-term effectiveness and permanence and the reduction of toxicity, mobility and volume

through treatment; and considered the preference for treatment as a principal element, the bias against off-site land disposal of untreated waste, and community and state acceptance. The selected remedy provides the best balance of trade-offs among the alternatives. As the scope of this operable unit does not include treatment of Site contaminants, each alternative, including the selected remedy, utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

E. The Preference for Treatment Which Permanently and Significantly Reduces the Toxicity, Mobility or Volume of the Hazardous Substances as a Principal Element is Not Applicable to the Selected Remedy

The reduction of mobility, toxicity and volume was determined not to be applicable to this operable unit since treatment of Site contaminants is not an objective of this operable unit.

XII. DOCUMENTATION OF SIGNIFICANT CHANGES

EPA presented a proposed plan (preferred alternative) for remediation of the Site on June 26, 1990. The alternate water supply preferred alternative was AW-1 Reactivation of the Donna Road Aquifer. This Alternative included the following four elements: (1) permitting/pre-design studies, (2) groundwater extraction, (3) treatment, and (4) delivery to distribution system. Based on public comment, the following two components were added to the selected alternative:

1. should the Donna Road Aquifer be unable to provide the entire lost demand of 0.31 mgd, any incremental difference between 0.31 mgd and the amount of water the Donna Road Aquifer provides will be obtained by increasing the diversion of the Farm River. If however, the production of ground water from Donna Road is insufficient to support the balance between the remedy selection criteria, EPA may reexamine the remedy. EPA anticipates that a water production from Donna Road of less than 0.21 may prompt such a reevaluation; and
2. in addition to the routine monitoring required at public drinking water supplies, a yearly round of sampling, full TCL organics, TAL inorganics and pesticides will be performed.

XIII. STATE ROLE

The Massachusetts Department of Environmental Protection has reviewed the various alternatives and has indicated its support for the selected remedy. The State has also reviewed the Alternate Water Supply Focused Feasibility Study to determine if the selected remedy is in compliance with applicable or relevant and appropriate State Environmental laws and regulations. The State of Massachusetts concurs with the selected remedy for the Baird & McGuire Site Alternate Water Supply Study. A copy of the declaration of concurrence is attached as Appendix C. In accordance with Section 104 of CERCLA, Massachusetts is responsible for 10 percent of the cost of the remedial action. In the case of the selected remedy the Commonwealth's share is estimated to be 118,800.

TABLE 1

SUMMARY OF GROUNDWATER SOURCE SCREENING

BAIRD & MCQUIRE WATER SUPPLY FEASIBILITY STUDY

SITE	PROBABLE YIELD (mgd)	POTENTIAL FOR FUTURE CONTAMINATION	NEEDED DISTRIBUTION SYSTEM MODIFICATIONS	EXPECTED TREATMENT NEEDED FOR IRON AND MANGANESE	DEVELOPMENT WOULD IMPACT EXISTING WATER SUPPLIES	POTENTIAL REGULATORY ISSUES	RECOMMENDED FOR FUTURE INVESTIGATION
Donna Road Wellfield	0.3	Low	Minor	Yes	No	Yes	Yes
Coina Pit	0.13	High	Minor	Yes	No	No	No
South Street Wellfield	0.31+	High	Minor	Yes	No	No	No
Tower Hill	<0.31	Low	Moderate	Yes	Probable	No	No
Clevers Brook	0.31	High	Moderate	Yes	No	No	No
Town Line	0.31	Low	Moderate	Yes	Probable	Yes	No
Beaver Brook	1.3	Low	Major	Yes	Probable	Yes	No

NOTES:

Section 3 discusses potential regulatory issues.

TABLE 2

SUMMARY OF SURFACE WATER SOURCE SCREENING

BAIRD & MCQUIRE WATER SUPPLY FEASIBILITY STUDY

SITE	PROBABLE YIELD (mgd)	POTENTIAL FOR FUTURE CONTAMINATION	REQUIRES NEW CONSTRUCTION OR EXCAVATION	EXPECTED TREATMENT NEEDED FOR IRON AND MANGANESE	POTENTIAL REGULATORY ISSUES	RECOMMENDED FOR FUTURE INVESTIGATION
Farm River	1.3	Moderate	No	Yes	No ¹	Yes
Cochate River	1.9	Moderate	No	Yes	No ¹	Yes
Blue Hill River	0.62	Moderate	Yes	Yes	Yes ²	No
Dear and Mary Lee Swamps	0.37	Moderate	Yes	Yes	Yes ³	No
Expansion of Richards Reservoir	Variable	Moderate	Yes	Yes	Yes ⁴	No

NOTES:

- ¹ Diversion of flow may reduce downstream low flows to unacceptable levels.
- ² Creating a needed impoundment would flood upstream wetlands.
- ³ Diversion of flow would severely reduce downstream flows.
- ⁴ Excavation may require alteration of wetlands.

TABLE 3

COMPARATIVE SUMMARY OF WATER SUPPLY ALTERNATIVES

BAIRD & MCQUEEN WATER SUPPLY FEASIBILITY STUDY

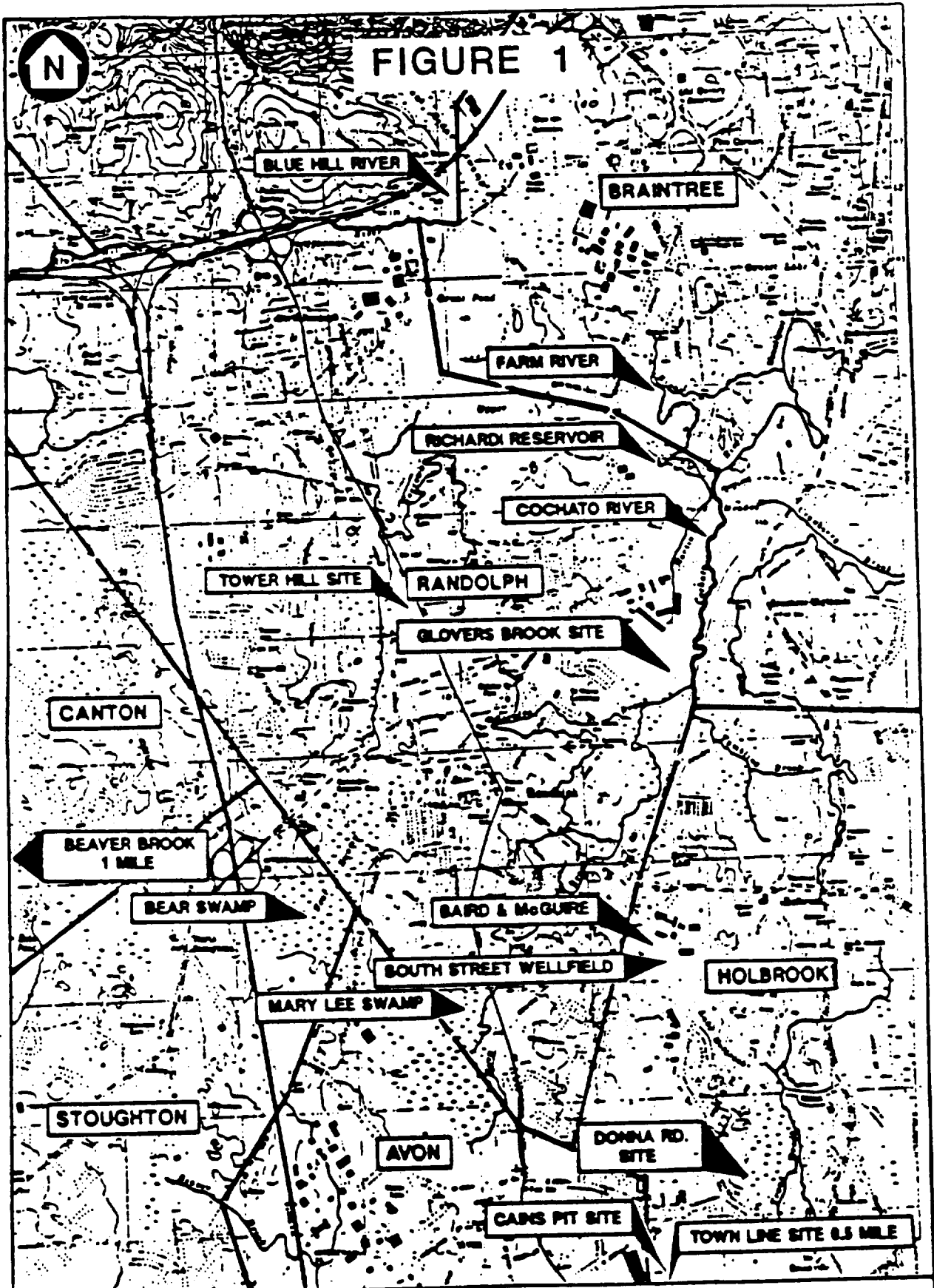
CRITERIA	DONNA ROAD ACQUEDUCT	FARM RIVER DIVERSION	COCHATO RIVER DIVERSION
ENGINEERING ANALYSIS			
Timeliness	Estimated 16 months to develop as water supply, including 12 weeks for further hydrogeologic investigation, 6 weeks for installation and testing of wells, and 52 weeks for design and construction of treatment facility.	Estimated 9-month design and construction of Randolph-Hallbrook water treatment facility upgrade. Estimated 3 to 6 months for design and installation of manganese treatment. No time will be required for construction of diversion or distribution facilities.	Estimated 9-month design and construction of Randolph-Hallbrook water treatment facility upgrade. Estimated 3 to 6 months for design and installation of manganese treatment. No time will be required for construction of diversion or distribution facilities.
Performance	Proposed system should be effective for supply and treatment of water.	Proposed system should be effective for supply and treatment of water.	Proposed system should be effective for supply and treatment of water.
Reliability	Treatment methods and mechanical equipment should be reliable.	Upgraded water treatment facility should be reliable for treatment; age of plant makes ongoing repairs likely.	Upgraded water treatment facility should be reliable for treatment; age of plant makes ongoing repairs likely.
Implementability/ Constructability	No physical problems foreseen with construction or access. Operation will not require full-time staffing, requires additional staffing.	Schedule of proposed treatment plant upgrade not under control of EPA. Treatment of Lost Demand will not require additional staffing.	Schedule of proposed water treatment facility upgrade not under control of EPA. Treatment of Lost Demand will not
Safety	Does not pose safety risks beyond those associated with routine construction activities.	Does not pose safety risks beyond those associated with current diversion and treatment.	Does not pose safety risks beyond those associated with current diversion and treatment.
COST ANALYSIS			
	<p>New Source Pre-design Studies \$531K</p> <p>Water Treatment Facility Capital Cost \$461K</p> <p>Total Capital Cost \$992K</p> <p>Total Annual Operation and Maintenance Cost \$ 23K</p> <p>Present Worth of Operation and Maintenance \$196K</p> <p>Total Present Worth \$1,188K</p>	<p>Cost Presented in 9.31 and</p> <p>New Source Pre-design Studies \$180K</p> <p>Water Treatment Facility Upgrade Capital Cost \$123K</p> <p>Potassium-permanganate Facility Capital Cost \$ 3K</p> <p>Total Capital Cost \$306K</p> <p>Total Annual Operation and Maintenance Cost \$ 8K</p> <p>Present Worth Operation and Maintenance \$ 68K</p> <p>Total Present Worth \$374K</p>	<p>Cost Presented in 9.31 and</p> <p>New Source Pre-design Studies \$180K</p> <p>Water Treatment Facility Upgrade Capital Cost \$123K</p> <p>Potassium-permanganate Facility Capital Cost \$ 3K</p> <p>Total Capital Cost \$306K</p> <p>Total Annual Operation and Maintenance Cost \$ 8K</p> <p>Present Worth of Operation and Maintenance \$ 68K</p> <p>Total Present Worth \$374K</p>
ENVIRONMENTAL ANALYSIS			
Discharges of Contaminants	Treatment for iron and manganese would generate backwash water and solids. Water can be discharged to surface water or sewer system. Solids can be landfilled.	Backwash water and solids can be handled using current backwash treatment method.	Backwash water and solids can be handled using current backwash treatment method.

TABLE 3

(continued)
COMPARATIVE SUMMARY OF WATER SUPPLY ALTERNATIVES

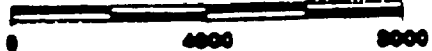
BAIRD & MCQUIRE
WATER SUPPLY FEASIBILITY STUDY

CRITERIA	DONNA ROAD AQUIFER	FARM RIVER DIVERSION	COCHATO RIVER DIVERSION
ENVIRONMENTAL ANALYSIS (Continued)			
Disruption of Normal Community Activities	Major disruption of community activities due to construction-related activities not anticipated.	Major disruption of community activities due to construction-related activities not anticipated.	Major disruption of community activities due to construction-related activities not anticipated.
Characteristics of Long-term System Operation	Should not cause disruption or nuisance.	Should not cause disruption or nuisance. Diversion during low flow may create extreme low flows downstream.	Should not cause disruption or nuisance. Diversion during low flow may create extreme low flows downstream.
Failure of Alternative System	Probability of failure considered low. Failure of proposed system would increase existing demand on Randolph-Holbrook water treatment facility slightly.	Failure of water supply would have major adverse impact on Great Pond system safe yield. Failure of water treatment facility would jeopardize entire Randolph-Holbrook supply.	Failure of water supply would have impact on Great Pond system safe yield during drought conditions. Failure of water treatment facility would jeopardize entire Randolph-Holbrook supply.
Processes That Increase Contamination	Drilling and construction in Trout Brook bottomland can be managed to minimize or eliminate erosion in Trout Brook.	No construction will be necessary in the Farm River basin.	No construction will be necessary in the Cochato River basin.
PUBLIC HEALTH ANALYSIS			
	Will mitigate risk by providing uncontaminated water supply.	Will mitigate risk by providing uncontaminated water supply.	Will mitigate risk by providing uncontaminated water supply.
REGULATORY AND INSTITUTIONAL ANALYSIS			
	Construction in wetland will require permit. Massachusetts Water Management Act and New Source approvals required. Treatment for iron and manganese needed to comply with Secondary Maximum Contaminant Levels. Exceeds Massachusetts Maximum Contaminant Level for sodium.	Treatment for iron and manganese may be required to meet Secondary Maximum Contaminant Levels. Additional authorization may be required for increased diversion pursuant to Massachusetts Water Management Act. Diversion may reduce downstream flows during low-flow conditions. Exceeds Massachusetts Maximum Contaminant Level for sodium.	Treatment for iron and manganese may be required to meet Secondary Maximum Contaminant Levels. Additional authorization may be required for diversion pursuant to Massachusetts Water Management Act. Diversion may reduce downstream flows during low-flow conditions. Exceeds Massachusetts Maximum Contaminant Level for sodium.



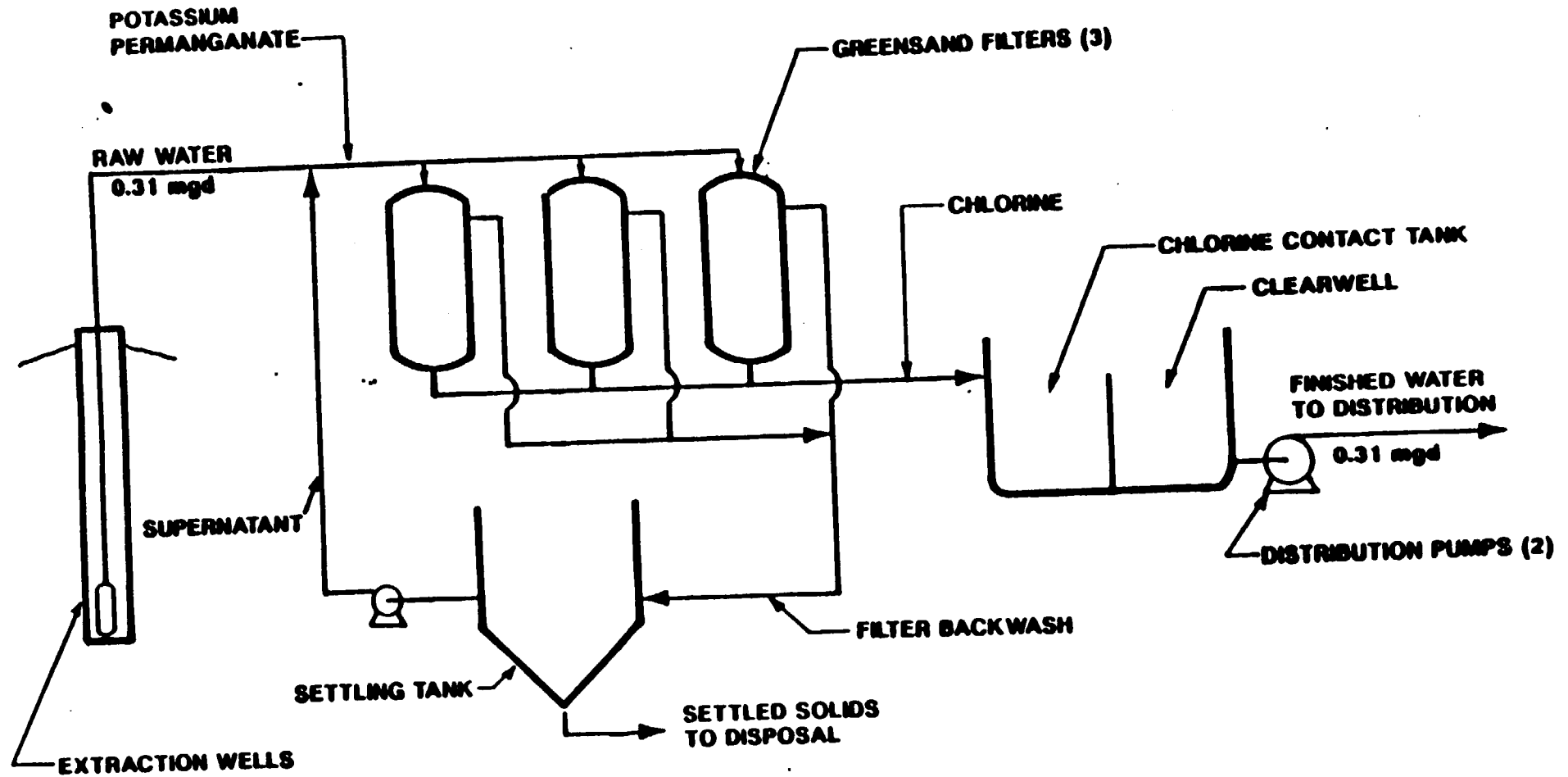
SOURCE: U.S.G.S. QUADRANGLE, BLUE HILLS, MASS., 1971, PHOTOREVISED 1979.

SCALE IN FEET



**CANDIDATE SITE LOCATIONS
BAIRD & MCGUIRE
WATER SUPPLY FEASIBILITY STUDY
EC JORDAN CO**

FIGURE 2



**DONNA ROAD CONCEPTUAL TREATMENT SCHEMATIC
BAIRD & MCGUIRE
WATER SUPPLY FEASIBILITY STUDY**